

Claims

*What is claimed is:*

1. A method of etching an organic dielectric layer over a substrate, comprising:  
5 placing the substrate in an etching chamber;  
providing an etchant gas comprising NH<sub>3</sub> into the etching chamber; and  
generating a plasma from the NH<sub>3</sub>, which etches the organic dielectric layer.
2. The method, as recited in claim 1, wherein the NH<sub>3</sub> has a flow rate between 5 sccm to  
10 1500 sccm.
3. The method, as recited in claim 2, further comprising placing a hard mask over the organic dielectric layer.
- 15 4. The method, as recited in claim 3, further comprising:  
placing a patterned photoresist layer over the hard mask layer; and  
simultaneously stripping the photo resist layer during the etching of the organic dielectric layer.
- 20 5. The method, as recited in claim 4, further comprising providing CH<sub>3</sub>F while providing the etchant gas comprising NH<sub>3</sub>.
6. The method, as recited in claim 5, wherein the CH<sub>3</sub>F has a flow rate between 1 sccm to 50 sccm.

7. The method, as recited in claim 6, further comprising providing an etch with an etchant gas comprising CF<sub>4</sub>, prior to the step of providing the etchant gas comprising NH<sub>3</sub>.

5 8. The method, as recited in claim 7, wherein the etchant gas comprising CF<sub>4</sub>, further comprises C<sub>4</sub>F<sub>8</sub>.

9. The method, as recited in claim 8, wherein the etchant gas comprising CF<sub>4</sub> further comprises O<sub>2</sub>.

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10. The method, as recited in claim 9, wherein the O<sub>2</sub> has a flow rate of between 3 sccm and 300 sccm.

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11. The method, as recited in claim 10, wherein the organic dielectric layer is made of an organic low-k material.

12. The method, as recited in claim 1, further comprising placing a hard mask over the organic dielectric layer.

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13. The method, as recited in claim 12, further comprising:

placing a patterned photoresist layer over the hard mask layer; and

simultaneously stripping the photo resist layer during the etching of the organic dielectric layer.

14. The method, as recited in claim 1, further comprising providing CH<sub>3</sub>F while providing the etchant gas comprising NH<sub>3</sub>.

15. The method, as recited in claim 14, further comprising providing an etch with an etchant gas comprising CF<sub>4</sub>, prior to the step of providing the etchant gas comprising NH<sub>3</sub>.

16. The method, as recited in claim 1, wherein the organic dielectric layer is made of an organic low-k material.

17. An integrated circuit formed from an etched organic dielectric layer over a substrate, made from the steps comprising:

placing the substrate in an etching chamber;

providing an etchant gas comprising NH<sub>3</sub> into the etching chamber; and

generating a plasma from the NH<sub>3</sub>, which etches the organic dielectric layer.

18. The integrated circuit, as recited in claim 17, wherein the NH<sub>3</sub> has a flow rate between 5 sccm to 1500 sccm.

19. The integrate circuit, as recited in claim 18, further comprising:

placing a hard mask over the organic dielectric layer.

placing a patterned photoresist layer over the hard mask layer; and

simultaneously stripping the photo resist layer during the etching of the organic dielectric layer.